ATMOSPHERIC CONCENTRATIONS OF HALOCARBONS IN ANTARCTICA (Abstract)

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Background concentrations of atmospheric halocarbons (CCl_2F_2, CCl_3F, CH_3CCl_3, $CHClCCl_2$ and CCl_2CCl_2) in Antarctica were measured and compared with those observed in the Northern Hemisphere (N.H.). Air samples were collected at 500–1000 m NE (upwind direction) of Syowa Station in January–February of 1981 and 1982, and analyzed by EC gaschromatography after 2–3 months at The University of Tokyo. All the samples collected in pre-evacuated all-stainless steel canisters were found to show very close values each year, which indicates that our sampling and storage techniques are appropriate and also that the distributions of the halocarbons in the Southern Hemisphere are quite uniform. The observed concentrations of CCl_2F_2 and CCl_3F in Antarctica were 312 and 169 pptv, respectively, in 1982 (pptv$=10^{-12}$v/v), and were 8–10% lower than the background concentrations we have observed in the mid-latitude N.H. (Hokkaido) in accordance with their main release in the N.H. and extremely long lifetimes in the troposphere (>50 years). The concentrations of CH_3CCl_3 were $\approx$30% lower in Antarctica indicating the tropospheric lifetime of 7–10 years. The concentrations of $CHClCCl_2$ and CCl_2CCl_2 with much shorter lifetimes (<a few months) were below the detection limits (<0.5 pptv) in Antarctica.

(*Received April 8, 1983*)

ATMOSPHERIC VARIATIONS AROUND THE PASSAGE OF SOLAR SECTOR BOUNDARIES IN ANTARCTICA (Abstract)

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Variations of temperature around the passage of Solar Sector Boundaries (SSB) are investigated, for the purpose of finding a response corresponding to the response in the Arctic regions. The Arctic response in the troposphere is that the temperature reaches a minimum on the passage date of SSBs in winter. The upper air meteorological data of some Antarctic stations, mainly Amundsen-Scott, are used in the period from 1964 to 1976.

The most remarkable variation in winter and summer is that the temperature of the polar station (Amundsen-Scott) reaches a maximum after the passage of SSBs. At 500 mb the temperature on the third half-day after the passage of SSBs is 1.24 K higher than the mean value. This variation, which is most remarkable at the 500 mb level and limited in the troposphere, appears only in winter (June–September) from 1965 to 1971. In the case the time filtering is applied, t-value of the temperature on the third half-day at the 500 mb level is 3.67, which is much smaller than that of the Arctic response, -6.49. It is doubtful to conclude that this variation is a response to the passage of SSBs from the statistical point of view, because 3.67 may result from many posteriori selections.

However, the vertical structure of this variation and the season and year when

this variation occurred are almost the same as those of the Arctic response. The differences of the date and tendency between the Arctic and Antarctic responses cause no problem, because the same disturbance can cause the opposite direction of the heat flux, if the basic state is different. This variation in Antarctica must have the same origin as the Arctic response.

(*Received April 8, 1983*)

UPPER STRATOSPHERIC CIRCULATIONS: A COMPARISON BETWEEN THE NORTHERN AND SOUTHERN HEMISPHERES (Abstract)

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By the use of observations from Nimbus-5 and TIROS-N/NOAA satellites the upper stratospheric circulations are investigated, especially by paying attention to the differences between the Northern Hemisphere (N.H.) and the Southern Hemisphere (S.H.).

One of the most notable features of the thermal structure in the upper stratosphere is the reversal of north-south gradient of the zonal temperature observed in higher latitudes of the S.H. in late winter. This pattern regularly appears every year in the S.H., while it is highly variable in the N.H. because of the occurrence of sudden warmings.

From the statistical analysis, it is found that variability of the zonal mean tempeature is much different between the two hemispheres: The increase of the S.H. temperature is highly oscillatory throughout the period from winter to summer, whereas the temperature in the N.H. increases abruptly in midwinter and rather gradually from spring to summer. In association with the temperature variation, the transient planetary waves of wavenumber 2 are predominant in the S.H., in contrast to the dominant steady waves in the N.H.

It is also found that these characteristics of thermal field and wave activity are closely connected with the seasonal variation of zonal mean wind in the stratosphere.

For details, the reader may refer to the full paper of this work (HIROTA *et al.*: Q. J. R. Meteorol. Soc., **109**, 443, 1983).

(*Received March 30, 1983*)

SEASONAL VARIATION OF THE VERTICAL GRADIENT OF GLOBAL MEAN TEMPERATURE IN THE UPPER STRATOSPHERE (Abstract)

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Seasonal variation of the vertical gradient of global mean temperature in the upper staratosphere is investigated with the use of the data from the top channels of Nimbus 5 Selective Chopper Radiometer (SCR) for two years from 1973 to 1974 on daily basis. As the index of the temperature gradient is introduced the